

Analog

TEMPERATURE CONTROLLERS

athenacontrols.com



ATHENA CONTROLS, INC.
5145 Campus Drive
Plymouth Meeting, PA 19462-1129
U.S.A.



TABLE OF CONTENTS

Model	Page
Series 18104
Series 40006
Series 2000 and 30208
Series 8610
Series 8812

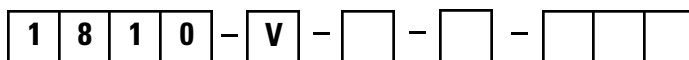
SERIES 1810

1/8 DIN Temperature Controller

- PID Control with no complicated menu setup
- Type J or K Thermocouple Input
- Front-Panel Linearized Analog Set-point Dial
- Deviation Bargraph consisting of 10 LEDs
- Four Output Types Available
- Selectable Fixed-Ratio Control
- Auto-Resets for Load Change
- Output #1 De-Energizes When Open Sensor Is Detected
- LED Indication When Output Is Present
- LED Indication When Temperature Exceeds Setting and Relay Is Energized (Dual Output Models)
- Optional Alarm and Proportional Cooling Available



Ordering Information



Output #1
 B = SPDT relay
 F = 4-20 mA dc
 T = SPDT SS relay
 S = Pulsed dc

Output #2 (SPDT 2 A/240 Vac relay)
 0 None
 B High alarm only
 C Low alarm only
 D High and low alarm
 P Proportional (Cool)

Standard Thermocouple Scale Ranges		
Code	Range	Input
03F	0 to 300 °F	Type J
08F	0 to 800 °F	Type J
01F	0 to 1000 °F	Type J
05C	0 to 500 °C	Type J
16F	100 to 600 °F	Type J
02F	0 to 2000 °F	Type K
01C	0 to 1000 °C	Type K



SERIES 1810 TEMPERATURE CONTROLLER SPECIFICATIONS

INPUT SPECIFICATIONS

Sensor	Thermocouple types J, K
Cold Junction Compensation	Electrical
Thermocouple Break Protection	Built-in upscale, failsafe to open sensor
Common Mode Rejection*	Maximum error, $\pm 1^{\circ}\text{C}$ or equivalent $^{\circ}\text{F}$ with 240 V 60 Hz applied as a common mode signal between sensor input and chassis ground
Series Mode Rejection*	Maximum error, $\pm 1^{\circ}\text{C}$ or equivalent $^{\circ}\text{F}$ with series mode signal of 100 mV pk-to-pk at 60 Hz

*Applies to all models except "F" and "S" output types when used with other than Athena® SCRs or stagers

OUTPUT SPECIFICATIONS

Output #1 Types	<p>B = mechanical relay, 10/8 A @ 120/240 Vac</p> <p>T = SS relay, 1 A holding, 10 A inrush</p> <p>S = pulsed dc, 0-20 Vdc</p> <p>F = 4-20 mA dc</p>
Output #2 (optional)	SPDT 2A/240Vac relay (for temperature deviation or for proportional cooling applications, adjustable $\pm 0.5\%$ to $\pm 5\%$ of span)

PERFORMANCE SPECIFICATIONS

Ambient temperature Range	32 to 131°F (0 to 55°C)
Setpoint Resolution	0.25% of span
Proportional Band	Heat: 5% fixed, Auto-Adjust cycle time 10 second minimum Cool: 2% of range, fixed
Calibration Accuracy	0.5% of span at calibrated points
PID Time Constant	
Fast	Rate (Derivative): 0.1 sec Reset (Integral): 20 sec
Medium	Rate (Derivative): 15 sec Reset (Integral): 80 sec
Slow	Rate (Derivative): 50 sec Reset (Integral): 330 sec

DISPLAYS AND INDICATORS

Temperature	Direct reading scale
Deviation	LED bar graph
Outputs	Red LEDs indicate when output is present and (dual output only) when temperature has exceeded the setting and the relay is energized

ELECTRICAL POWER SPECIFICATIONS

Input Voltage	102-264 V
Frequency	50-60 Hz
Power Usage	Less than 5 VA

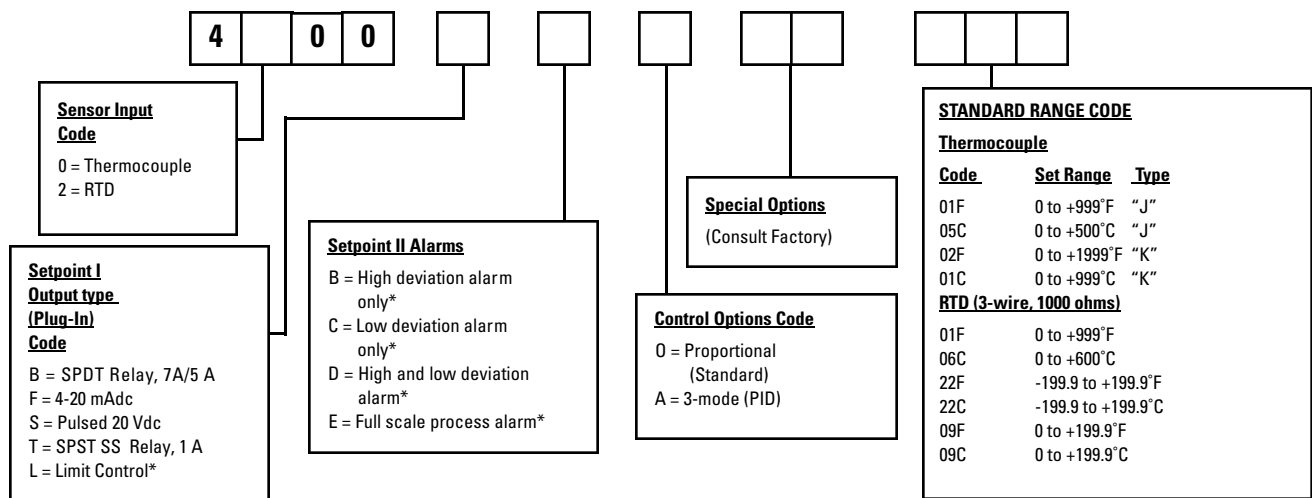
SERIES 4000

Digital Indicating, Full Feature Short Case Temperature Controllers

- Accurate Proportional Temperature Control Ideal for Most Processes
- Noise-Immune Analog Circuitry
- Filtered Digital LED Display with 1 or 0.1 Readability Available
- 25-turn Setpoint Pots-Optional Second (Alarm) Setpoint
- Adjustable Bandwidth and Manual Reset to Eliminate Offset Error
- Choice of Standard Outputs for Energizing Most Common Output Devices
- Compact 1/4 DIN Case
- 3-Mode PID Available
- Available as FM-Approved Limit Controller



Ordering Information



Example

Model 4000-B-E-05C = a controller with a thermocouple sensor input; and SPDT relay output (non plug-in) for setpoint I; a full scale process alarm for setpoint II; and a thermocouple J input range of 0 to 500°C.

*Not available on 4200

Athena's ZC/PC solid state contactors, and Series 91 and 93 or Series 19 and 39 SCR power controllers, can be added to boost ac load switching capacity.





SERIES 4000 TEMPERATURE CONTROLLER

SPECIFICATIONS

Line Voltage: 120/240 V $\pm 10\%$, 50/60 Hz $\pm 15\%$

Power Consumption: Less than 5 VA

Common Mode Rejection: Maximum error $\pm 1^\circ\text{C}$ with 240 V, 60 Hz applied as a common mode signal between sensor input and chassis ground

Series Mode Rejection: Maximum error $\pm 1^\circ\text{C}$ with series mode signal of 100 mV pk-to-pk at 60 Hz

Sensor Break Protection: Up scale standard, zero output for open sensor

Thermocouple: Maximum lead resistance 100 Ω for rated accuracy, cold junction compensation standard

RTD: 100 ohms (0°C) Platinum, DIN coefficient standard

Setpoints: Momentary switch displays Set I or Set II (optional), 25-turn pot provides 1 or 0.1 settability, range dependent; Set I-Adjustable over full span; Set II-process alarm (-E) adjustable over full span. Deviation alarm (-B,-C,-D), consult factory.

Setpoint Repeatability: $\pm 0.1\%$ to $\pm 0.2\%$ of span

Setpoint Resolution: 1 or 0.1 (Range dependent)

Calibration

Accuracy: a. T/C input $\pm 0.4\%$ of span over 10% to 90% of range
 b. RTD inputs $\pm 0.1\%$ of span for 1°F or 1°C ranges; $\pm 0.2\%$ of span for 0.1°F or 0.1°C ranges

Ambient Stability: a. T/C input $3\text{ V}/^\circ\text{F}$ ambient to input
 b. RTD input 0.1% for 80° to 130°F (27° to 55°C)

Process Indication: Filtered LED, 3 or 3-1/2 digits, 2 readings per second update; readability is 1°F , 1°C , 0.1°F or 0.1°C , range dependent

Dimensions: Front Panel - 3.780 sq. in. (96 mm^2)
 Case - 4.646" (118 mm)
 Depth Behind Panel - 3.780" (92 mm)
 Panel Cut-out - 3.622 sq. in. (92 mm^2)

Note: Applies to all units with exception of "F" output controllers when used with other than Athena SCRs or stagers.

Output Type	Setpoint I (Plug-In)					Setpoint II	
	B	F	S	T	L	B,C,D	E
	SPDT relay resistive load rating 7 A/120 V 5 A/240 V 50 VA inductive	4-20mA dc into 1000 ohms maximum not isolated from thermocouple	Pulsed DC for driving SS contactors 0-20 V, open ckt; 0-20mA, short ckt; not isolated from thermocouple	SPST SS relay, zero voltage switched 1 A 120/240 V ac, 10 A inrush, 2-4mA leakage.	Limit Controller	SPDT relay 3 A $\phi 120\text{ V ac}$ resistive (4000 only)	SPDT relay 3 A $\phi 120\text{ V ac}$ resistive
Proportional Band	Adjustable for .2to 5% of span				Not applicable	On/off(see differential below)	On/off(see differential below)
Output cycle time (Switch selectable)	On-off 5-10-15 seconds	Continuous Proportioning	0.5-1.0-1.5 seconds	0.5-1.0-1.5 seconds	Not applicable	Not applicable	Not applicable
Manual reset (Off-set)	Standard - adjustable for full proportional bandwidth (Eliminated if PID is ordered)				Not applicable	Not applicable	Not applicable
Optional 3-mode (PID) action	Fast = 0.1 sec. rate, 48 sec. reset; Medium = 18 sec. rate, 90 sec. reset; Slow = 65 sec. rate, 300 sec. reset				Not applicable	Not applicable	Not applicable
Differential	0-5% adjustable				Not applicable	$\pm 1^\circ\text{F}$ or $\pm 1^\circ\text{C}$	1% maximum of unit span
Indication	Red LED "ON" when output signal is present or relay is energized				Red LED "ON" when output signal is present or relay is energized		
Operating Ambient	30° to 131°F (0 to 55°C)					30° to 131°F (0 to 55°C)	

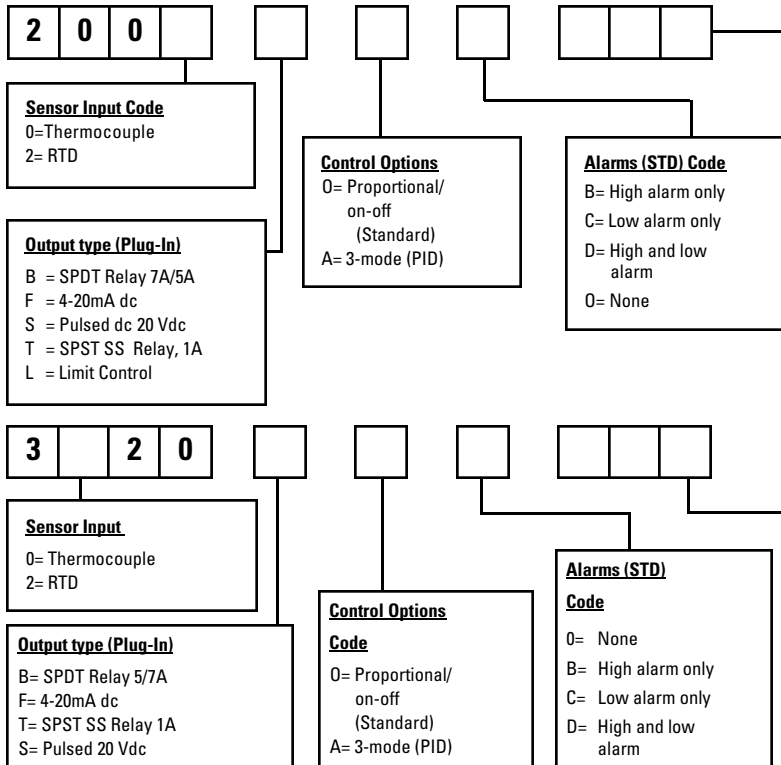
SERIES 2000 and 3020

Full Feature Analog Temperature Controllers

- Accurate Proportional Temperature Control Ideal for Most Processes
- Noise-Immune Analog Circuitry
- Simple to Use (No Programming Required)
- Thermocouple or RTD Input
- Adjustable Bandwidth and Reset
- Optional PID
- Adjustable High/Low Alarm
- Linearized Analog setpoint (2000)
- Digital Push-Button setpoint (3020)
- Limit Controller Configuration Available (2000 only)



Ordering Information



STANDARD RANGE CODE

(Special analog temperature setpoints available, consult factory)

Thermocouple

Code	Set Range	Type
14F	-100 to +400°F	T
03F	0 to +300°F	J
04F	0 to +400°F	J
13F	-100 to +350°F	J
16F	100 to +600°F	J
08F	0 to +800°F	J
01F	0 to +1000°F	J
03C	0 to +300°C	J
05C	0 to 500°C	J
51F	500 to +1500°F	K
02F	0 to +2000°F	K
25F	0 to +2500°F	K
01C	0 to +1000°C	K
30F	0 to 3000°F	R

Platinum RTD (3-wire, 100Ω @ 0°C)

R30	0 to 300°F
R60	0 to 600°F
R10	0 to 1000°F
R06	0 to 600°C

STANDARD RANGE CODE

Thermocouple

Code	Set Range	Type
01F	0 - 999°F	J
05C	0 - 500°C	J
02F	0 - 1999°F	K

Platinum RTD (3-wire, 100Ω at 0°C, DIN CURVESTD)

R10	0 - 999°F	100
-----	-----------	-----

Athena's ZC/PC solid state contactors, and Series 91 and 93 or Series 19 and 39 SCR power controllers, can be added to boost AC load switching capacity.





SERIES 2000 & 3020 ANALOG TEMPERATURE CONTROLLERS

SPECIFICATIONS

Line Voltage: 120/240 V \pm 10% to \pm 15%, 50-60 Hz
 Power Consumption: Less than 5VA
 Setpoint: 2000 - Analog-Single turn potentiometer 270° rotation
 3020 - Mechanical digital potentiometer
 Setpoint Resolution: 2000 - 0.2% span
 3020 - 1°F or °C
 Indication: Temperature: Deviation meter \pm 50°F or \pm 30°C of setpoint
 Load: Red LED output light
 Alarm: Red LED
 Accuracy: \pm 0.5% of span at calibration points.
 Cold Junction Compensation: Automatic, electrical
 Setpoint Repeatability: 0.3% of span (2000)
 Thermocouple Break Protection: Failsafe, open sensor, output zero, Upscale indication on meter
 Input: 2000 - J,K,R,T, thermocouples
 Platinum RTD DIN standard
 3020 - J,K, thermocouple
 Platinum RTD DIN standard
 Sensor Lead Resistance: Thermocouple, maximum lead resistance 100 for specified accuracy
 Proportional Band: On/off or nominal 5-50°F (3-30°C).
 Offset (manual reset): Adjustable over 100% of proportional band
 Rate (derivative): 0.5 to 40 seconds
 Reset (integral): 0.7, 1, 2 or 4 minutes via internal switches
 Alarm: 2°F differential
 Common Mode: Maximum error \pm 1°C with 240 V, 60 Hz applied

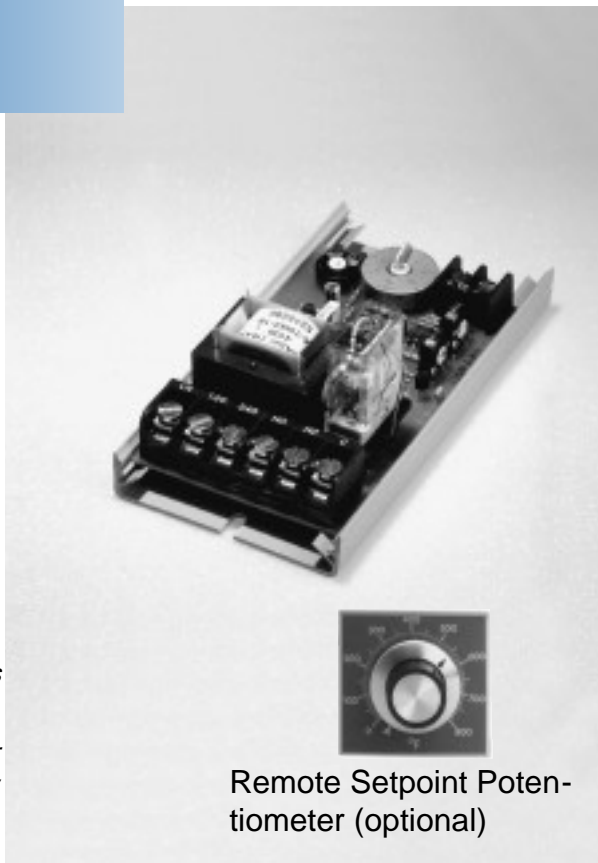
Rejection: As a common mode signal between sensor input and chassis ground
 Series Mode Rejection: Maximum error = 1°C with series mode signal of 100 mV pk-to-pk at 60 Hz
 Ambient Temperature: 32° to 131°F (0° to 55°C)
 Dimensions: Front Panel- 3.780 sq. in. (96mm²)
 Depth Behind Panel- 3.780" (96mm)
 Panel cutout- 3.622 sq. in. (92mm²)

Output Type	B	F	S	T	L	Alarm
Output (field changeable modules)	SPDT relay Resistive load rating: 7 A/120 V 5 A/240 V, 50 VA inductive	4-20 mAdc into 1000 maximum; not isolated from thermocouple	Pulsed DC for driving SS contactors 0-20 V, open ckt; 0-20 mA, short ckt; not isolated from thermocouple	SPST SS relay, zero voltage switched 1A 120/240 Vac, 10 A inrush, 2-4 mA leakage.	Limit Controller	SPDT relay 3A @ 120 V resistive
Output cycle time (Switch selectable)	On-off, 5-10-15 seconds	Continuous Proportioning	0.5-1.0-1.5 seconds	0.5-1.0-1.5 5-10-15 seconds	N/A	On-off
Proportional Band		On-off or nominal 5°F-50°F (3°C-30°C) (front panel adjustment)			N/A	2°F differential

SERIES 86

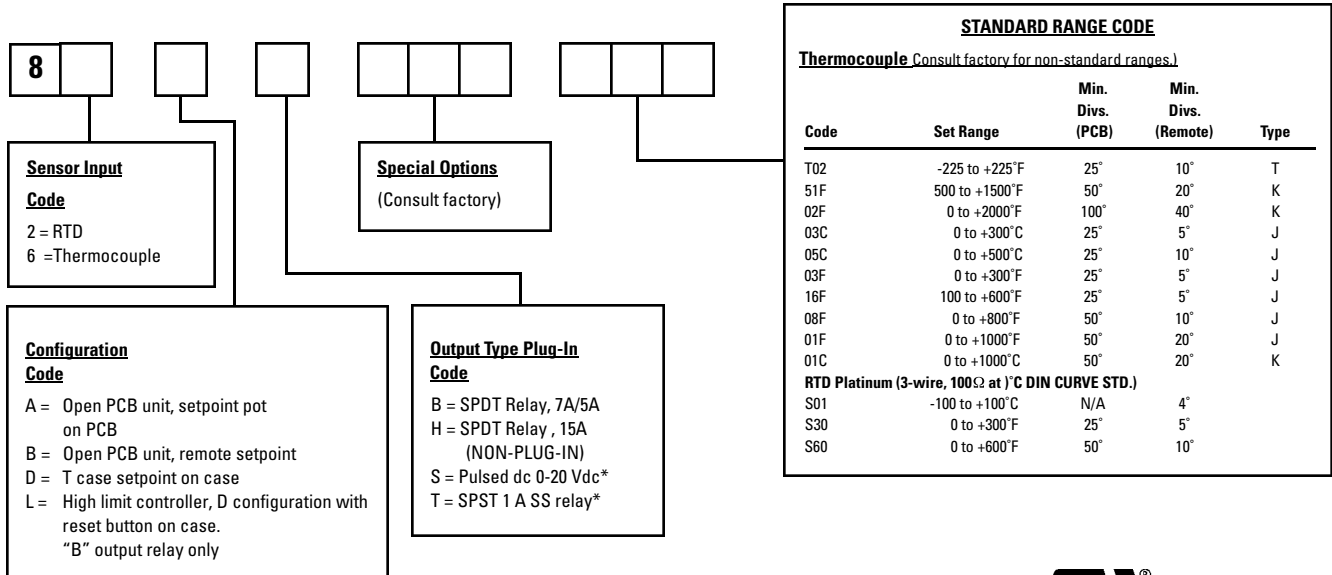
Low Cost, Non-Indicating Temperature Controller

- Differential (on-off) to Proportional Control via Simple Adjustment
- Case or Track Mounted Versions
- Single-turn, 270° Rotation Potentiometer
- Field Changeable Control Outputs: Relay, SS Relay or Pulsed Voltage
- Failsafe in Open Sensor Conditions
- Optional Remote Setpoint
- Optional Solid-State Contactors for Boosting Power Handling Capacity
- Cooling Configuration Available
- Thermocouple or RTD Input
- Limit Controller Option



Remote Setpoint Potentiometer (optional)

Ordering Information



*Athena's ZC solid state contactors, and Series 91Z and 93Z or Series 19 and 39 SCR power controllers can be added to boost AC load switching capacity.

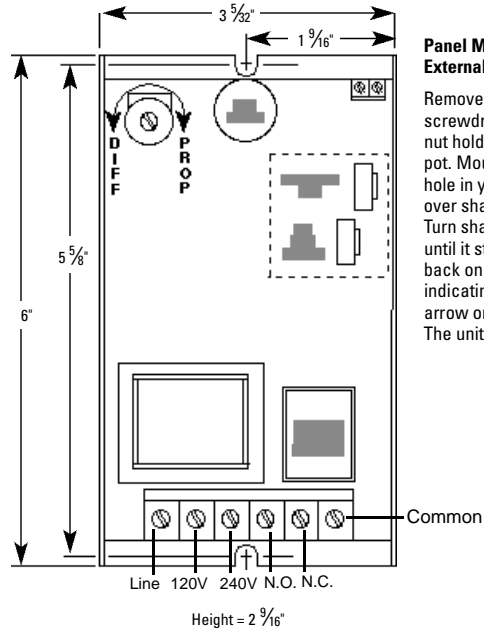




SERIES 86 NON-INDICATING TEMPERATURE CONTROLLER

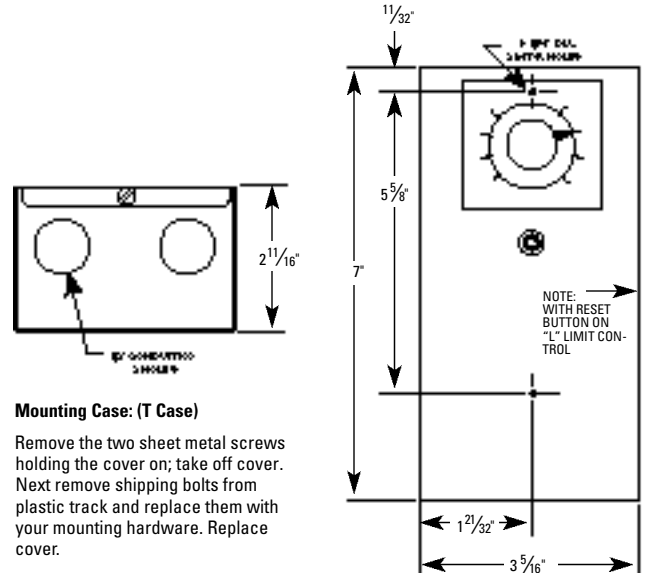
SPECIFICATIONS

Setpoint:	Single-turn, 270° rotation potentiometer (local or remote) is standard. Remote digital thumbwheel available for RTD only.
Setpoint Resolution:	1% with circuit board potentiometer, 1/4% with remote potentiometer
Calibration Accuracy:	1% at calibration points with remote potentiometer. 2% at calibration points, potentiometer on circuit board
Ambient Temperature Range:	40° to 130° F (4° to 55° C)
Cold Junction Compensation:	Internal electrical bridge
Hysteresis/Proportional Band:	Thermocouple adjustable from hysteresis of 5° to proportional band of 25° RTD deadband is 3° to proportional band of 10°.
Thermocouple Break Protection:	Output power off with open sensor.
Output:	Plug-in modules: Type B Relay S.P.D.T. 7A/5A @ 120/240V Type H Relay S.P.D.T. 15A/7A @ 120/240V (NON PLUG IN) Type T S.S. Relay S.S.T. 1A 120/240Vac, 10A inrush, 2-4mA leakage Type S Pulsed dc, 0-20Vdc open ckt. not isolated from sensor.
Supply Voltage:	120/240 ± 10%V, 50-60Hz
Power Consumption:	2 watts



Panel Mounting External Setpoint:

Remove knob with small screwdriver and take off the nut holding the scale to the pot. Mount pot through a 3/8" hole in your panel; put scale over shaft and tighten nut. Turn shaft counterclockwise until it stops. Now put knob back on and line up its indicating mark with the arrow on scale. Tighten knob. The unit is now calibrated.



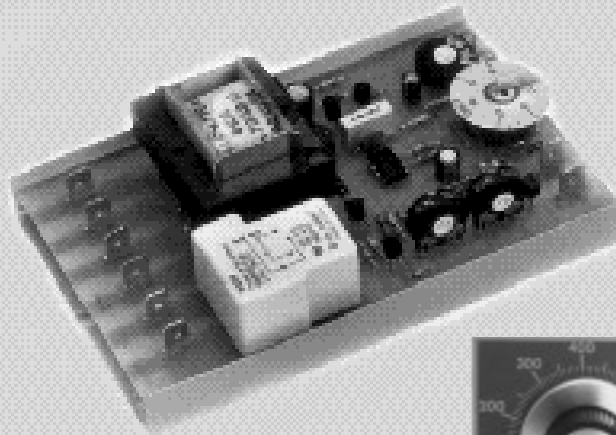
Mounting Case: (T Case)

Remove the two sheet metal screws holding the cover on; take off cover. Next remove shipping bolts from plastic track and replace them with your mounting hardware. Replace cover.

SERIES 88

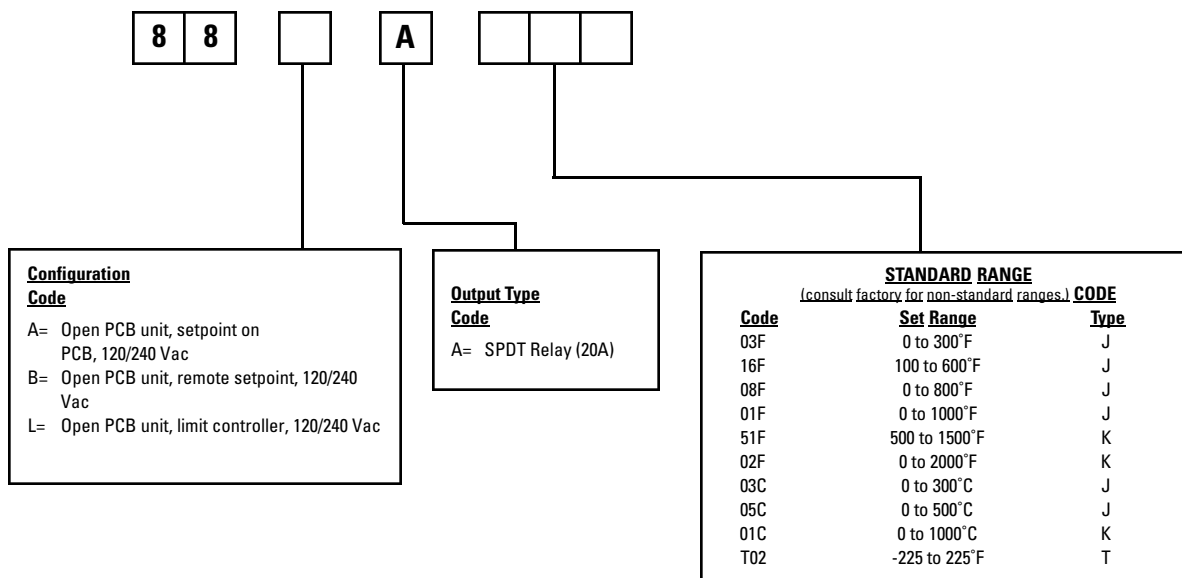
Electronic Temperature Controllers

- Superior Replacement for Bulb and Capillary Controllers
- On-Off or Time Proportioning
- 20 Amp Relay Output
- Failsafe on Open Sensor
- No Calibration Necessary
- 1% Accuracy
- Thermocouple Input
- Track Mounted
- Cooling Processes
- Limit Controller Option



Remote Setpoint Potentiometer (optional)

Ordering Information

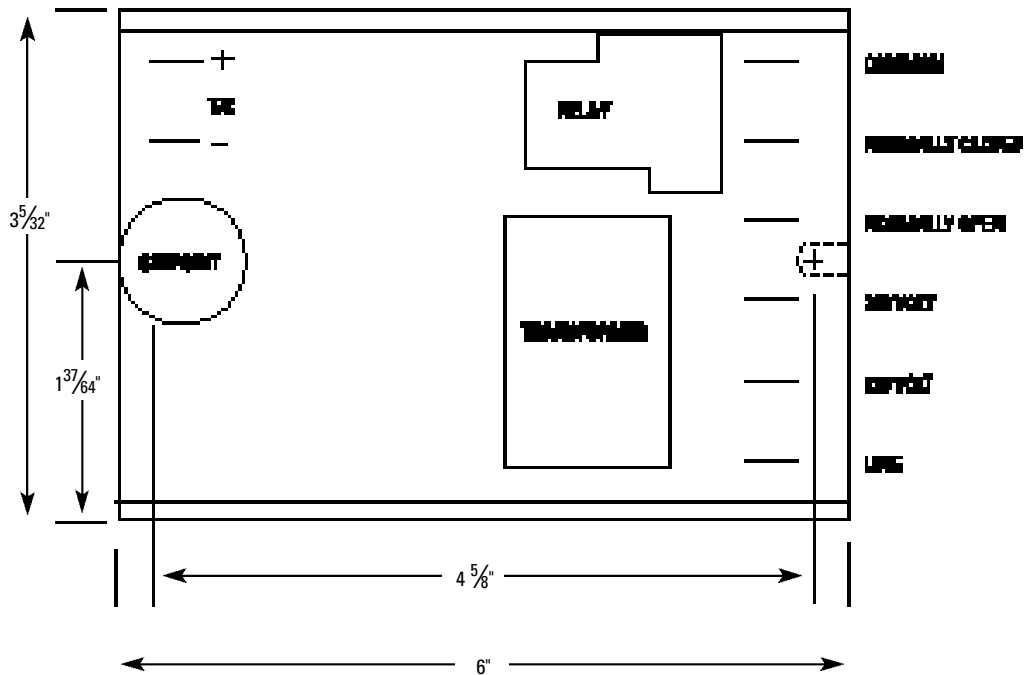




SERIES 88 ELECTRONIC TEMPERATURE CONTROLLER

SPECIFICATIONS

Control Mode:	Adjustable from hysteresis of 5° F to proportional of 25° F
Control Power:	120/240 Vac ±10%
Input:	Thermocouple, sensor break protection
Ambient Temperature:	32° to 150° F (0° to 66°C)
Humidity:	5 to 95% non-condensing
Output:	SPDT relay 20 A 120/240 Vac
Cold Junction Compensation:	Internal electrical bridge
Power Consumption:	<2 watts
Connections:	Fast-on lugs



NOTES

NOTES

ALSO FROM ATHENA CONTROLS...

Universal Digital Controllers



Power Controls



Custom Control Solutions



Power Handlers



Hot Runner Controllers



Vintage Controllers



Tudor™ Temperature Sensors



Athena Controls, Inc. • 5145 Campus Drive • Plymouth Meeting, PA 19462 • Toll-Free in U.S.: 800.782.6776
Tel: 610.828.2490 • Fax: 610.828.7084 • E-mail: sales@athenacontrols.com • Internet: athenacontrols.com